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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,314	11/26/2003	Bharath SV Kumar	140275-1	2929

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EXAMINER

MOTSINGER, SEAN T

ART UNIT	PAPER NUMBER
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2624

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10/15/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/724,314

Applicant(s)

KUMAR ET AL.

Examiner

Sean Motsinger

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 7/23/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Applicants Arguments/Amendments

1. Regarding the objection to the drawings Applicants arguments have been fully considered and are found to be persuasive the generation of data to reconstruct the image is sufficiently depicted in the drawings. Therefore the objection to the drawings has been withdrawn
2. Regarding the rejection of claim 11 under 35 U.S.C. 112 second paragraph applicants arguments have been fully considered. Due to the cancellation of claim 11 this Rejection is moot. However new 112 issues have arisen due to applicants amendments to the claims (see 112 second rejections bellow.
3. Regarding the rejection of claims 1-21 under 35 U.S.C. 103(a), applicants arguments have been fully considered but are rendered moot by the new grounds of rejection indicated below.

Objection to the Specification

4. The amendment filed 7/30/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: in

claim 22 "specially configured" there is not support for the word "specially" in the specification as originally filed.

5. Applicant is required to cancel the new matter in the reply to this Office Action.

Rejections under 35 U.S.C. 112 First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This claim is confusing because applicant appears to include elements of the wavelet decomposition process into a claim directed only to a process of wavelet synthesis. In the context of the claim these elements make no sense. Claim 10 appears to be directed to a method of progressive image navigation. This would seem to involve performing inverse wavelet transforms and inverse DPCM on data compressed via a wavelet transform and DPCM to provide successively higher resolutions on a region of interest. Therefore notion of performing wavelet transforms and DPCM on a low resolution "first representation" after which providing

a progressive increase in resolution to said first representation does not makes sense and is not disclosed in the specification.

Rejections Under 35 U.S.C. 112 Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claims is confusing because applicant appears to include elements of the wavelet decomposition process into a claim directed only to a process of wavelet synthesis. In the context of the claim these elements make no sense. Claim 10 appears to be directed to a method of progressive image navigation. This would seem to involve performing inverse wavelet transforms and inverse DPCM on data compressed via a wavelet transform to provide successively higher resolutions on a region of interest. Therefore notion of performing wavelet transforms and DPCM on a low resolution "first representation" after which providing a progressive increase in resolution to said first representation is confusing ambiguous.
8. For the purpose of examination examiner interprets claim 10 to read "A method of processing medical image data comprising: providing a first representation of a group of cross sectional images previously transformed by a wavelet transform in an

axial direction and previously transformed by performing a differential pulse code modulation in a spatial direction, the first representation having a first axial resolution and a first spatial resolution to allow selection of the group of cross sectional images; and progressively providing a second representation of the cross sectional images, the second representation having a second axial resolution comparatively greater than the first axial resolution to provide comparatively greater axial detail than an axial detail of the first representation.”

Rejections Under 35 U.S.C. 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al US 6,567,081 in view of Dekel et al US 2003/0005140 in further view of Gu et al. US 7,006,568.
10. Re claim 1 Li discloses a method of processing image data comprising: receiving data indicative of a group of consecutive cross sectional images (see column 10 lines 20-23 figure 10 note the consecutive cross sectional images shown in figure 10), of a three dimensional volume being imaged (see column 10 lines 20-23), each

of the cross sectional images being perpendicular to a z-axis (x axis 29-32 note the x-axis in this case is described as axis along which frame lifting is taking place i.e. is the axis which is perpendicular), the group of consecutive cross sectional images having a first axial resolution in a z-axis direction (note there must be some resolution in this direction) and having a first spatial resolution in x-axis (z axis) and y-axis (column 10 line 30) directions orthogonal to the z-axis (figure 11 note the x and y axes are orthogonal); and transforming (wavelet decomposition column 10 line 32) the group of consecutive cross sectional images in the z-axis (x-axis column 10 line 35) direction to generate an axially transformed representation of the group (column 10 line 35), the axially transformed representation having a second axial resolution lower than the first axial resolution (column 9 lines 28-31 note that wavelet transform can provide reduced resolution representations).

11. Performing a wavelet transform (column 10 lines 25-40) on the axially transformed representation in x-axis and y-axis directions (y,z plane column 10 lines 35-38) to generate a spatially transformed representation (note y and z are clearly spatial dimensions) of the axially transformed representation (column 10 lines 35-38), the spatially transformed representation having a second spatial resolution lower than the first spatial resolution (column 9 lines 28-31 note that wavelet transform provides reduced resolution representations).
12. Li does not disclose also performing differential pulse code modulation with the wavelet transform in x-axis and Y axis direction. Gu discloses DPCM with the wavelet transform in x-axis and Y axis direction (column 14 lines 15-20.) The

motivation to combine is "encode these signals with the lowest possible bit rate"
(column 1 lines 50-55)

13. Li also does not disclose using this process for medical images, however Dekel discloses using a 3-d wavelet transform for medical images (see title). The motivation to combine Denkel is to do "lossless progressive streaming of 3-d images over the internet of speed and quality unknown in the prior art" see paragraph 12. Therefore it would be obvious to combine Li with Denkel to reach the aforementioned advantage.

14. Re claim 2 Li further discloses generating reconstruction data (compressed data see abstract) to allow reconstruction (decompression see abstract) of the group from the axially transformed representation.

15. Re claim 3 Li further discloses providing the axially transformed representation to a viewer (note the representation is decompressed and displayed see abstract and figure 1). Dekel further discloses progressively providing the reconstruction data (ROI data paragraph 12) to allow reconstruction of the group at the first axial resolution (lossless quality paragraph 12 and 13).

16. Re claim 5 Li further discloses performing entropy encoding of the axially transformed representation (see figure 3 element 308).
17. Re claim 8 Li further discloses providing the spatially transformed representation (compressed image see abstract and figure 1) to a viewer (note the representation is decompressed and displayed see abstract and figure 1).
18. Dekel further discloses progressively providing information (ROI data paragraph 12) to allow reconstruction of the spatially transformed representation (compressed version paragraph 12).
19. Re claim 9 comprising performing entropy encoding of the spatially transformed representation (see figure 3 element 308).
20. Re claim 10 Li discloses a method of processing image data comprising:
providing a first representation of a group of cross sectional images images previously transformed by a wavelet transform (wavelet decomposition column 10 line 32) in an axial direction (x-axis column 10 line 35), the first representation having a first axial resolution and a first spatial resolution (note this representation must have some axial and statial resolution) to allow selection of the group of cross sectional images
21. Gu discloses transformed by performing a differential pulse code modulation in a spatial direction (column 14 lines 15-20)

22. Denkel discloses progressively providing a second representation (progressive streaming paragraph 13) of the cross sectional images, the second representation having a second axial resolution comparatively greater than the first axial resolution (paragraph 0222 note the information is provided progressively by resolution i.e the resolution of the next representation will be greater) to provide comparatively greater axial detail than an axial detail of the first representation.
23. Re claim 11 Li further discloses providing a third representation by transforming the first representation in a spatial direction (transforming in yz plane column 10 line 30-40), the third representation having a transformed spatial resolution comparatively less than the first spatial resolution (column 9 lines 28-31 note that wavelet transform can provide reduced resolution representations).
24. Re claim 12 Li discloses method of processing image data comprising: receiving data indicative of a group of consecutive cross sectional images (see column 10 lines 20-23 figure 10 note the consecutive cross sectional images shown in figure 10), of a three dimensional volume being imaged (see column 10 lines 20-23), each of the cross sectional images being perpendicular to a z-axis (x axis 29-32 note the x-axis in this case is described as axis along which frame lifting is taking place i.e. is the axis which is perpendicular); transforming (wavelet decomposition column 10 line 32), in one dimension, a plurality of the images in a z-axis direction (x-axis

column 10 line 35) to generate a first transformed representation of the three dimensional volume wherein the transforming in one dimension comprises at least one level of wavelet decomposition (wavelet decomposition column 10 line 32); and transforming (wavelet decomposition column 10 lines 30-27), in two dimensions (yz plane column 10 lines 36 and 37)), the first transformed representation in an x-axis (z axis) direction orthogonal to the z-axis (x axis) direction and a y-axis (y axis) direction orthogonal to the z-axis (x axis) to generate a second transformed representation of the three dimensional volume (column 10 lines 30-37 note the second transformed representation is the representation created by the y z plane decomposition). Wherein the transforming in two dimensions comprises performing at least one level of wavelet decomposition (column 10 lines 36 and 37)

25. Gu discloses performing at least one level of differential pulse code modulation (column 14 lines 15-20)
26. Dekel discloses using a 3-d wavelet transform for medical images (see title).
27. Re claim 13 Li discloses wherein transforming in one dimension (one axis column 10 line32) further comprises performing at least one level of wavelet decomposition (column 10 line 32).
28. Re claim 14 Li discloses wherein transforming in one dimension (plane column 10 line 33) further comprises performing at least one level of wavelet decomposition (column 10 line33).

29. Re claim 15 Li further discloses performing entropy encoding (figure 3 element 308) of at least one of the group consisting of the first transformed representation and the second transformed representation (note entropy encoding is preformed on the 3-d wavelet transformed image)
30. Re claim 16 Li further discloses wherein performing entropy encoding further comprises Huffman encoding (column 14 line 1).
31. Re claim 18 Li further discloses further comprising generating a data stream comprising information for reconstructing the second transformed representation (the horizontal and vertical reconstruction column 19 lines 20-35), followed by information for reconstructing the first transformed representation (column reconstruction lines 30-35).
32. Dekel discloses transforming progressively see paragraph 12.
33. Re claim 20 Dekel discloses progressively extracting at least a portion of the information (data blocks paragraph 237) from the data stream according to a desired level of viewing detail (resolution paragraph 237) of the three dimensional volume.

34. Re claim 21 Li discloses constructing the second transformed representation (the horizontal and vertical reconstruction column 19 lines 20-35), then reconstructing the first transformed representation (column reconstruction lines 30-35).
35. Dekel discloses to achieve a desired level of viewing detail (resolution paragraph 237) of the three dimensional volume.
36. Re claim 22, Claim 22 is a computer processor configured to perform the method of claim 1. Lin further discloses performing his method on a computer (see figure 1).
37. Claim 17 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Li, Gu, and Dekel in view of common knowledge.
38. Re claim 17 Li and Dekel disclose all of the elements of claim 16 and Huffman encoding. Li does not disclose where Huffman encoding further comprises creating a Huffman look up table. However examiner is taking official notice that it is notoriously well know to use a Huffman look up table when doing Huffman encoding. The motivation is well know as well the advantage is to provide fast, memory efficient Huffman encoding. Therefore it would have been obvious to one of ordinary skill in the art to combine Li, Dekel and common knowledge in the art to reach the aforementioned advantage

39. Re claim 19 Li and Dekel disclose all the elements of claim 18 they do not disclose wherein the data stream further comprises an entropy decoding table for decoding entropy encoded data. However examiner is taking official notice that it is notoriously well known to include a decoding table in a data stream containing entropy encoded material. The motivation is well known as well the advantage is to provide a decoding table to the recipient of the stream. Therefore it would have been obvious to one of ordinary skill in the art to combine Li, Dekel and common knowledge in the art to reach the aforementioned advantage.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean Motsinger whose telephone number is 571-270-1237. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571)272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Motsinger
8/3/2007


JINGGE WU
SUPERVISORY PATENT EXAMINER